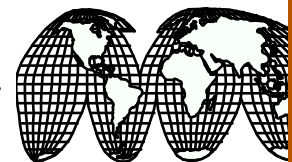
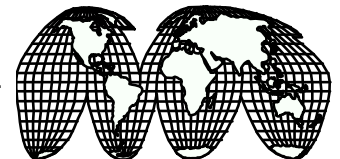


***Optimized Profile Descents
A.K.A. CDA
A “New” Concept
RTCA Airspace Working Group***

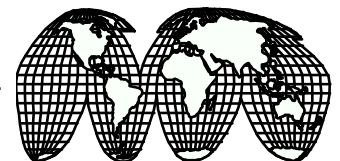
**Presented to
Environmental Working Group
December 05, 2007**



- **RTCA Airspace Working Group**
 - Charter and Terms of Reference
 - Objectives
 - Membership and Organization
 - Activities and Deliverables
- **Optimized Profile Descent White Paper**
 - Purpose
 - Overview of Contents....*DRAFT*



- **Derived from June 28, 2005 letter from Nancy Kalinowski, Director Airspace Management and Aeronautical Information Management to RTCA:**
“...we have relied on RTCA and the Airspace Working Group to understand the operational views...”
“...scope of the Airspace Working Group to include interactions and input on local airspace efforts, national airspace projects and other airspace usage policy issues...”
“reaffirmation of our commitment to working with the aviation industry stakeholders through RTCA on airspace redesign efforts.”



- **The NAS is rapidly evolving from traditional ground based navigation and surveillance, and voice based communications systems to a performance based system.**
- **Flight operations are evolving from traditional mix of manned, fixed wing aircraft to a complex mix of classic and next generation air carrier aircraft, regional jets, Very Light Jets, Unmanned Aircraft Systems, and space vehicles...**
- **The future airspace system must accommodate the new technologies and the operating business models of a greater number of diverse customers.**

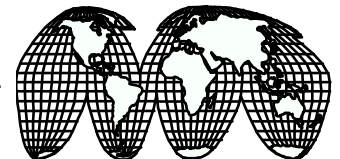


Summarized from Terms of Reference...

- **Develop strategic recommendations on operational components of the nation's future airspace, including traffic flow management's relationship to airspace management and day-to-day air traffic control**
- **Serve as a forum to identify operational redesign goals, define success measurements, and ensure customer feedback on decisions concerning airspace design, management and usage policy**



- **Technical subgroup of the Requirements and Planning Workgroup of the Air Traffic Management Advisory Committee**
- **Chairs: one from airlines and one from general aviation**
- **General membership: Operational representatives from Airlines, NBAA, RAA, ATA, AOPA, ALPA, Military, MITRE-CAASD**
- **Six Sub-groups:**
 - **Northeast: primarily New York & Philadelphia**
 - **Western-Pacific: primarily LA Basin & Bay Area**
 - **Midwest/Southeast: primarily Chicago & Florida**
 - **Southwest: primarily Houston**
 - **North Central: primarily Denver and Minneapolis**
 - **Unmanned Aircraft Systems: operational integration of UASs into the NAS**

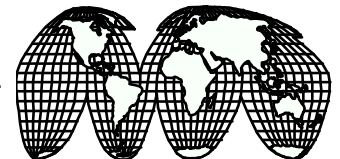


- **Informational forum for ongoing airspace efforts**
 - Large scale redesign: MASE, High Altitude, NY, So Cal, No Cal
 - Las Vegas, Atlanta and Dallas-Forth Worth RNAV
 - Airspace for new runways (MSP, CVG, ATL, ORD)
- **Objective round-table for military/civilian airspace issues**
- **Input on overarching priorities for national and regional airspace efforts**
 - Direct impact on creation of the Florida Airspace Optimization project and priority of Potomac Airspace completion
- **Formal recommendations, where appropriate**



- **Comments on FAA's Airspace Management Program and Regional Subgroup Initiatives (provided at least once annually)**
- **Report out on Integration of UAS's into NAS Operations (4th Qtr 2007)**
- **Report out on "Airspace on Demand" Concept (4th Qtr 2007)**
- **White Paper on integration and use of "Alternate Approach Procedures" in the NAS (4th Qtr 07)**

-OPTIMIZED PROFILE DESCENTS-



Why is the AWG Interested in this Issue?

- **Increasing Congestion in the NAS**
- **Increasing Environmental Concerns**
 - Noise
 - Emissions
 - Fuel Burn
 - Green House Gases....**Climate Change**
- **Lack of Standardization**
 - Both within the U.S. and Internationally
- **Potential Airspace Design, Traffic Flow, and Capacity Impacts**
- **Perceived by Some as “Silver Bullet” Solving Congestion and Environmental Concerns**

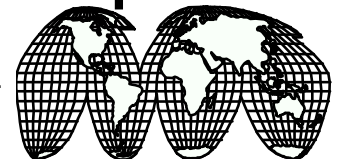


The AWG White Paper Is Intended to:

- ***Define* the Concept**
- **Identify Industry Consensus on Pros and Cons**
- **Offer Suggestions on Transitioning the Concept from an Experimental Procedure to Everyday Operational Usage**



- An Optimized Profile Descent (OPD) is an arrival procedure that has one or more of the following elements:
 - Starts ideally at Top Of Descent (TOD), but is not necessarily an idle descent.
 - Has vertical and horizontal flight path containment resulting in predictability for the operator and controller.
 - Uses metering or spacing to address aircraft performance differences.
 - May contain “level off” or changes in descent rates during the course of the procedure to accommodate deceleration requirements.
- This procedure optimizes performance of a single aircraft; but may not optimize the “system” performance, nor does it optimize the use of airspace.

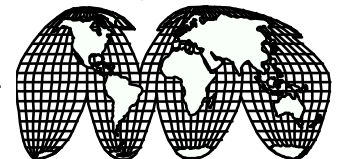


FAA STAR Order

- **CDA - Continuous Descent Arrival - May also be referred to as Continuous Descent Approach or Continuous Descent Angle.**
 - A procedure with an optimized descent profile that minimizes level off segments.

FAA EWG OPS-SC Definition

- **Continuous Descent Arrival: *an arrival flight procedure (technique) where an aircraft is cleared to descend from cruise or an intermediate altitude until established on a stabilized approach using a best-economy power setting (usually identified as flight idle thrust) at all times. Such an arrival is continuously descending, except for the provision to utilize momentary level segments to slow aircraft without the need to change thrust settings (e.g., to meet the 250 knot restriction at 10,000 feet altitude). At final approach, thrust may be added to permit a safe, stabilized approach speed and flap configuration down a glide slope to the runway.***



- **The objective of a CDA is to reduce aircraft noise, fuel burn and emissions by means of a continuous descent, so as to intercept the approach glide path at an appropriate height for the distance to touchdown.**
- **A CDA is an aircraft operating technique in which an arriving aircraft descends from an optimal position with minimum thrust and avoids level flight to the extent permitted by the safe operation of the aircraft and compliance with published procedures and ATC instructions.**



- **May increase predictability of operator expected fuel burns and block times if OPDs are consistently issued and used over time**
- **Reduces fuel burn, and thus emissions, green house gases**
- **Reduces vectoring**
- **May reduce communications workload/ frequency congestion**
- **Better utilization of existing advanced avionics**



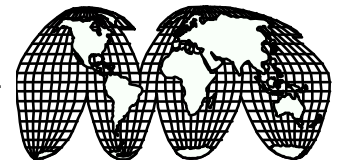
- **Complex, high volume metropolitan areas do not lend themselves to OPDs:**
 - OPD trials at busy airports have been done at off peak times with virtually no other traffic to complicate the approaches.
 - Potential impacts to satellite airports and departure traffic must be addressed.
- **OPDs may require additional enroute spacing between arrivals.**
- **Existing terminal and transition airspace design may inhibit the use of OPDs, particularly at metroplex locations. In order to facilitate the implementation of OPDs, ATC procedures need to be designed with crossing “windows” rather than “hard” crossing restrictions.**



- **Variations in aircraft and flight crew performance (FMS design and use) increase complexity and make it difficult to maintain minimum spacing at high density airports.**
- **Existing Class B airspace may require modification or expansion to contain new arrival routes designed to accommodate OPDs.**



- **Structured base line procedures need to be established identifying speeds, rates of descent, winds, etc., to establish consistent profiles (Procedure Design Criteria for Air Traffic).**
- **Inbound crossing restrictions that separate arrivals from departures or adjacent airport traffic flows need to become “window” restrictions; not single, hard altitude restrictions.**
- **FAA should implement RNAV STARs with optimized vertical profiles at all OEP airports. This would provide a significant step towards future OPD procedures.**



- **Human Factors studies are needed to assess changes in pilot and controller workload.**
- **Procedural/flyability issues, including pilot technique, aircraft energy management, and FMS performance variations (design and logic standards) need to be resolved.**
- **International harmonization of definition, procedure design and ATC handling need to be accomplished.**
- **The environmental review process for procedural and airspace changes needs to be streamlined.**
- **Near term OPD implementation should focus on lower activity locations; RNAV STARS, optimized to extent possible, should be implemented at OEP airports.**



- **Paper in Draft**
- **AWG meeting December 10, 2007**
- **RPWG Meeting December 11, 2007**
- **ATMAC Meeting – Spring 2008**

